STATEMENT

by **Assoc. Prof. Dr. Veronika Valentinova Mihaylova**

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on the materials submitted for participation in the competition for the academic position of "Associate Professor" at Plovdiv University "Paisii Hilendarski" in: field of higher education: **4. Natural Sciences, Mathematics and Informatics,** professional field: **4.2. Chemical Sciences (Analytical Chemistry)**

In the competition for "Associate Professor", announced in the State Gazette, No. 98 of 19.11.2024 and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Department of "Analytical Chemistry and Computational Chemistry" at the Faculty of Chemistry, the only candidate is Chief Assoc. Prof. Dr. Deyana Lyubomirova Georgieva from the same scientific unit.

1. General presentation of the procedure and the candidate

By order No. PD-22-82 of 17. 01. 2025 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury of a competition for the academic position of "Associate Professor" at PU in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.2. Chemical Sciences (Analytical Chemistry), announced for the needs of the Department of "Analytical Chemistry and Computer Chemistry" at the Faculty of Chemistry.

One candidate has submitted documents for participation in the announced competition: Chief Assistant Professor Dr. Deyana Lyubomirova Georgieva

The candidate has submitted a full set of materials on an electronic medium that meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and the Regulations on the terms and procedures for acquiring scientific degrees and for occupying academic positions at Plovdiv University "Paisii Hilendarski", and the specific requirements of the Faculty of Chemistry.

The documents are organized in 18 files, containing: a report on the fulfillment of the minimum national requirements under Art. 2b of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB) and the regulations of the Faculty of Chemistry; evidentiary materials for academic development; scientific guidance of graduate students and doctoral students; a list of published scientific articles and noted citations; an archive containing the full texts of the

scientific works for participation in the competition; participation in scientific forums; participation in scientific projects; habilitation report and author's self-assessment of the contributions of the scientific works. The presented materials are well organized and provide comprehensive information about the scientific and teaching activities of the candidate.

In the Register of the Academic Staff in the Republic of Bulgaria, maintained by the National Center for Information and Documentation (NACID), data are available for Chief Assoc. Prof. Dr. Deyana Lyubomirova Georgieva, including the acquisition of the educational and scientific degree "Doctor" as well as a list of 21 registered publications for the period 1997-2024 (https://ras.nacid.bg/dissertation-preview/42696).

2. Biographical data

The career development of Chief Assoc. Prof. Dr. Deyana Lyubomirova Georgieva is connected with the Faculty of Chemistry of the University of Plovdiv. She was initially appointed as a chemist (1994-2004), then continued her development as an assistant (2004-2008), superior assistant (2008-2010) and chief assistant from 2010 to the present. From the review of the candidate's biographical data, I can conclude that her long-term experience as a teacher and researcher is undeniable.

3. General characteristics of the candidate's activities

The candidate is a co-author of 26 scientific publications and 1 chapter of a collective monograph. Of the publications, 16 are in journals, referenced and indexed in the world databases of scientific information (Web of Science and Scopus; 10 publications – Q1; 1 publication – Q2; 1 publication – Q3; 4 publications – Q4) and 10 of the publications are in journals without impact factor and impact rank. In the competition for associate professor, the candidate participates with 14 scientific publications and 1 chapter of a collective monograph. At the time of submission of the documents for participation in the competition, over 140 citations (referenced and indexed in Scopus and Web of Science) have been noted, the Hirsch index (h-index) is 7. The scientific results have been presented in a total of 53 oral reports and poster presentations at national and international forums.

For participation in the competition for the academic position of "Associate Professor" , 14 articles and one book chapter have been selected, distributed in two groups of indicators. A reference under Art. 57a, para. 2 of the ZRAZSB for the required indicators of the candidate is attached, as follows:

1. Group of indicators A

Dissertation for the educational and scientific degree "Doctor" - defended dissertation on the topic "Solid-phase extraction with magnetic nanoparticles in the analysis of trace elements by plasma spectrometry" in the professional field: 4.2 Chemical Sciences, Diploma No. 1000143 / 06.04.2015 **- 50 points**;

2. Group of indicators B: Includes a total of 4 articles and one book chapter, which have been published in international scientific journals, referenced in the Web of Science and Scopus databases, with a distribution by quartiles, as follows: Q1 (3 pcs.); Q3 (1 pc.) and Q4 (1 pc.). The indicated publications carry **102 points**, which exceeds the required 100 for this indicator.

3. By group of indicators D: Scientific publications in publications that are referenced and indexed in world-renowned databases with scientific information (Web of Science and Scopus), outside indicator B – 10 publications have been attached, respectively in quartiles: Q1 – 6 issues, Q2 – 1 issue, Q3 – 1 issue and Q4 – 2 issues. **Total number of points – 209 points.**

4. By group of indicators E: Citations in scientific publications, monographs, collective volumes and patents, referenced and indexed in world-renowned databases with scientific information (Web of Science and Scopus) – a reference with a total of 140 citations has been attached: 25 citations of publications included in indicator B and 115 citations of publications included in indicator D. Total number of points **-280 points**.

5. By group of indicators E: Number of PhD students who defended their dissertations (joint supervision) – 1 PhD student – 25 points. **Total number of points -25 points.**

6. By group of indicators G: h – index =7– 70 points; Number of graduates who defended their dissertations- 3= 30 points. Participation in research projects- 9= 45 points. **Total number of points- 145 points.**

It should be noted that for some indicators, results significantly exceeding the minimum national requirements under the ZRASRB have been achieved. The recommended criteria for acquiring scientific degrees and occupying academic positions at the Plovdiv University "Paisii Hilendarski", professional direction 4.2 “Chemical Sciences” have also been met.

Scientific contributions of the candidate

The scientific research work and contributions of the candidate can be summarized in two main directions: A) Development and application of inductively coupled plasma mass spectrometry for the characterization of nanoparticle materials (publications under indicator B) and B)

Development and evaluation of approaches for sample preparation and spectrochemical methods for analysis in the determination of essential and potentially toxic elements in environmental samples (publications under indicator D).

In the first direction (A), a theoretical model was developed and a systematic study was conducted on the influence of various key factors affecting the fundamental setup of spICP-MS. For the first time, a study was conducted on the influence of the type of dispersion medium on the stability of nanocolloidal suspensions of Ag nanoparticles in spICP-MS analysis. An approach for experimental assessment of the mass fraction of the two forms of presence of the analyte (ionic and in condensed phase) was proposed. It has been experimentally proven that when introducing homogeneous ionic solutions of the analyte, the noise of the registered signal depends only on the delivered mass of the analyte, but not on the integration time. An approach is proposed for calculating the interval estimate of the diameters of nanoparticles of different composition and size. An experimental determination of the resolution of the spICP-MS method for a specific type of nanoparticles has been made, based on the average value of the interval estimates in the studied size range. The influence of the sample introduction system on the analytical characteristics of the spICP-MS method has been evaluated. The applicability of the developed spICP-MS method has been demonstrated in the characterization of Ag nanoparticles loaded with drug forms when studying the possibility of their application in nanomedicine.

The scientific and applied contributions of the research in the second direction (B) are related both to the development and evaluation of different approaches for sample preparation of samples for subsequent elemental analysis, and to the application of different spectrochemical methods for the determination of essential and potentially toxic elements in environmental objects.

A multifactorial experimental design was successfully applied to establish the parameters of ultrasound-assisted extraction (field amplitude and energy, treatment time, temperature and type and volume of the acid mixture) affecting the efficiency of the extraction of Cd, Co, Cr, Cu, Mn, Ni, Pb and Zn from environmental samples. A comparative analysis of the advantages and limitations of the method compared to the microwave-assisted extraction of the same elements was made. Also, in another study (G3), the optimal conditions for the preparation of soil samples were established in order to determine the total and plant-extractable content of phosphorus, which has essential functions in the plant organism. The possibilities of ligand-impregnated siliconized manganese-ferrite magnetic nanoparticles as a suitable sorbent in the solid-phase extraction of Co, Cu, Zn, Mo, Cd, Tl, Pb and Bi have been examined.

Regarding the application of spectrochemical methods for the determination of essential and potentially toxic elements in environmental samples, the contributions can be summarized in the development of fast, reliable and automated methods for the determination of various essential and

potentially toxic elements using FAAS, UV-Vis and ICP-MS. The developed methods have been applied to the analysis of soil and plant samples. An assessment of the ecological status of mountain river water basins in Bulgaria (G9) has been made based on the accumulation of Al, As, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb and Zn in aquatic plants. With the obtained results for the elemental composition, pollution factors (CF) and metal pollution index (MPI) were calculated, which were applied to assess the ecological status of the studied river basins.

Teaching activity of the candidate

For the period from 2004 to the present, Chiefr Asst. Prof. Dr. Deyana Georgieva has led lectures and practical classes in the Bachelor's and Master's Degree Programs of various specialties. Under her leadership, three students have successfully defended their diploma theses and she was the co-supervisor of one doctoral student. The documents presented show that Chief Asst. Prof. Dr. Deyana Georgieva has fulfilled the requirements for full academic load and has developed active teaching activities. This gives me reason to believe that she possesses professional competence and good teaching skills, attracting students and doctoral students to participate in scientific research and project activities.

4. Critical remarks and recommendations

I have no critical remarks.

CONCLUSION

The documents and materials presented by Chief Asst. Dr. Deyana Lyubomirova Georgieva meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the relevant Regulations of the Plovdiv University „Paisii Hilendarski“

The candidate in the competition has presented a sufficient number of scientific works published after the materials used in the defense of the educational and scientific degree "Doctor". The candidate's works contain original scientific and applied contributions that have received international recognition, as a representative part of them are published in journals and scientific collections published by international academic publishing houses. His theoretical developments have practical applicability, as some of them are directly oriented towards academic work. The scientific and teaching qualifications of Chief Asst. Dr. Deyana Lyubomirova Georgieva are undoubted.

The results achieved in the educational and research activities fully comply with the minimum national and additional requirements of the Faculty of Chemistry, adopted in connection with the Regulations of the University for the Implementation of ZRASRB.

After reviewing the materials and scientific papers presented in the competition, analyzing their significance and the scientific, scientific-applied and applied contributions contained therein, I find it reasonable to give my **positive assessment** and **recommend to** the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Chemistry for the election of **Chief Assistant Professor Dr. Deyana Lyubomirova Georgieva** to the academic position of "**Associate Professor**" at the Plovdiv University "Paisii Hilendarski" in: field of higher education **4. Natural Sciences, Mathematics and Informatics**, professional field: **Chemical Sciences (Analytical Chemistry)**.

12.03. 2025

Prepared the statement: .....

Assoc. Prof. Dr. Veronika Mihaylova